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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/564,645	01/13/2006	Okuyama Ryoichi	4174-060105	1845
28389 7590 05/14/2009 THE WEBB LAW FIRM, P.C. 700 KOPPERS BUILDING 436 SEVENTH AVENUE PITTSBURGH, PA 15219				
EXAMINER				
SCULLY, STEVEN M				
ART UNIT		PAPER NUMBER		
1795				
MAIL DATE		DELIVERY MODE		
05/14/2009		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/564,645

Applicant(s)

RYOICHI, OKUYAMA

Examiner

Steven Scully

Art Unit

1795

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 February 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 5-7, 9 and 11-16 is/are pending in the application.
- 4a) Of the above claim(s) 11-14 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 5-7, 9, 15 and 16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/S508)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____
- Paper No(s)/Mail Date _____

**FUEL CELL SYSTEM AND METHOD FOR DETECTING RUNNING OUT OF FUEL IN
FUEL CELL**

Examiner: Scully S.N.: 10/564,645 Art Unit: 1795 May 12, 2009

DETAILED ACTION

1. The Amendment filed February 6, 2009 has been entered. Claims 8 and 10 have been canceled, claims 11-14 were previously withdrawn and claims 15-16 are newly added. Accordingly, claims 5-7, 9 and 15-16 are pending in the application.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 103

3. Claim rejection of claims 5-7 and 9 under 35 U.S.C. 103(a) as being unpatentable over Becerra et al. (US2005/0014041) in view of Aoyagi et al. (US6,670,063) and Yamada (JP2001-069614) are withdrawn because claim 5 has been amended.
4. Claims 5 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Becerra et al. (US2005/0014041) in view of Aoyagi et al. (US6,670,063).

Applicant appears to be invoking U.S.C. § 112, 6th paragraph, wherein means-plus-function language is used in claims 5-7, 9 and 15-16.

With respect to claim 5, Becerra et al. disclose a fuel cell system comprising a fuel cell (18) and a backup battery (28). See Figure 1A. The fuel cell is any type of fuel cell, for example a direct methanol fuel cell. See [0027]. Further, the system comprises a detachable fuel canister that can be replaced when necessary for immediate replenishment of the fuel supply. See [0042]. When the fuel cell is out of fuel and thus providing a voltage below a predetermined value, the rechargeable backup battery (28) is used to provide power for the system. See [0042].

Becerra et al. are silent regarding a means for monitoring an output of the fuel cell. Aoyagi et al. disclose a fuel cell system comprising a fuel cell and a rechargeable battery. The fuel cell produces a measured voltage. See Figure 3. The battery capacity is monitored. See Figure 5. It would have been obvious to one of ordinary skill in the art to monitor the system of Becerra et al. because Aoyagi et al. teaches it to prevent the overcharging and overdischarging of the rechargeable battery. See abstract.

Aoyagi et al. disclose various battery demands depending on the battery's capacity. The battery's power demand is negative when the capacity is low and thus the fuel cell is utilized. See Figure 5. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the fuel cell to provide power when the battery capacity is low to prevent over discharge. See abstract.

Becerra et al. and Aoyagi et al. do not explicitly disclose allowing the remaining capacity in the battery to be greater than the required capacity to allow the fuel cell to restart. However, it is well known in the art that to restart a fuel cell, an initial load is

required from an outside source such as the battery in the system of Becerra et al. and Aoyagi et al. In order for the fuel cell to be capable of restarting and thus remain operable to produce energy, it would be required that the outside source has sufficient energy to provide for the startup steps of a fuel cell so that the system may remain operable. Thus, it would have been obvious to one of ordinary skill in the art to ensure the battery's remaining capacity did not drop below the required capacity to restart the fuel cell system so that the system remains operable.

With respect to claim 15, Becerra et al. disclose the system comprises a detachable fuel canister that can be replaced when necessary for immediate replenishment of the fuel supply. See [0042].

5. Claims 6, 7, 9 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Becerra et al. (US2005/0014041) in view of Aoyagi et al. (US6,670,063) as applied to claims 5 and 15 above, and further in view of Yamada (JP2001-069614).

With respect to claims 6, 7 and 9, as discussed above, Becerra et al. in view of Aoyagi et al. disclose monitoring the voltage of the fuel cell. This provides a detecting means for when there is a decrease in the output of the fuel cell as well. Further, because the fuel is out the load is obviously not produced by the fuel cell and thus is provided by the secondary battery. See [0042].

Becerra et al. in view of Aoyagi et al. are silent regarding a means of indicating a warning signal showing that the fuel cell is running out of fuel. Yamada discloses a system comprising a fuel cell and a backup battery where when a residue amount of

fuel of the fuel cell and capacity of the battery is below a predetermined value, an alarm is displayed. See [0007]. It would have been obvious to one of ordinary skill in the art at the time of the invention to display an alarm when fuel is low because Yamada teaches to display an alarm when fuel is low, indicating to the user that the fuel is low to make the user aware of the problem. Further, when the fuel is low the output of the fuel cell will decrease and a load from the secondary battery would thus be connected to maintain the operating load of the system.

With respect to claim 16, Becerra et al. in view of Aoyagi et al. are silent regarding warning that the fuel cell is running out of fuel when the remaining capacity of the secondary battery decreases below a predetermined value. Yamada discloses a system comprising a fuel cell and a backup battery where when a residue amount of fuel of the fuel cell and capacity of the battery is below a predetermined value, an alarm is displayed. See [0007]. It would have been obvious to one of ordinary skill in the art at the time of the invention to display an alarm when the remaining capacity is low because Yamada teaches to display an alarm when fuel and battery capacity are low, indicating to the user that the fuel is low to make the user aware of the problem.

Response to Arguments

6. Applicant's arguments filed February 6, 2009 have been fully considered but they are not persuasive. Applicant argues:

a) Becerra, Aoyagi and Yamada do not teach or suggest the system further including means for disconnecting the load from the secondary battery when the

capacity remaining in the secondary battery becomes less than or equal to a level at which the remaining capacity is greater than one which allows the fuel cell to restart.

Initially, Becerra et al. in view of Aoyagi et al. teach disconnecting the load from the secondary battery when the capacity is lowered. Becerra et al. and Aoyagi et al. do not explicitly disclose allowing the remaining capacity in the battery to be greater than the required capacity to allow the fuel cell to restart. However, it is well known in the art that to restart a fuel cell, an initial load is required from an outside source such as the battery in the system of Becerra et al. and Aoyagi et al., much the same as a battery in a car engine. In order for the fuel cell to be capable of restarting and thus remain operable to produce energy, it would be required that the outside source has sufficient energy to provide for the startup steps of a fuel cell so that the system may remain operable. Thus, it would have been obvious to one of ordinary skill in the art to ensure the battery's remaining capacity did not drop below the required capacity to restart the fuel cell system so that the system remains operable.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact/Correspondence Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven Scully whose telephone number is (571)270-5267. The examiner can normally be reached on Monday to Friday 7:30am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dah-Wei Yuan can be reached on (571)272-1295. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/S. S./
Examiner, Art Unit 1795

/Dah-Wei D. Yuan/
Supervisory Patent Examiner, Art Unit 1795